

MATERIAL STANDARD**SWITCHGEAR, 27 kV, THREE-POLE AUTOMATIC
TWO-WAY SOURCE TRANSFER - PADMOUNT****1. Scope**

- 1.1 This specification applies to the furnishing of a self-contained, fully automatic, totally enclosed, outdoor, metal-clad, 27-kV, three-phase switchgear assembly with a two-way source transfer switch supplying two 3-phase load taps with 200-ampere fuses that are suitable for load interruption.
- 1.2 This switchgear is intended for use on a 26.4-kV, three-phase, 60 Hertz, grounded neutral underground distribution system. The load will be single and three-phase underground distribution transformers serving public-use facilities that require high reliability.

2. General

- 2.1 Except as modified by this specification, the switchgear furnished shall comply with the material and testing requirements of the latest revisions of all applicable standards by ANSI, IEEE, and NEMA.
- 2.2 The complete assembly shall be integrally designed and produced by the manufacturer of the basic switching components, and the manufacturer shall be solely responsible for the performance of the basic switch components as well as the complete integrated assembly as rated.
- 2.3 All components of the switchgear shall be completely factory-assembled and tested.
- 2.4 The manufacturer shall provide sufficient notice to allow Light Department representatives to inspect the switchgear during its manufacture, if requested.

3. Rating

- 3.1 The rating of the entire switchgear assembly shall be 27 kV.
- 3.2 Each fused-feeder terminal shall have a continuous current rating of 200 amperes and a live switching rating of 200 amperes. It shall have a minimum one-time fault-closing duty cycle of 22,400 amperes asymmetrical, and a two-time fault-closing duty cycle of 13,000 amperes asymmetrical at 27 kV.
- 3.3 The transfer switches shall have a continuous current rating of 600 amperes and a live switching rating of 400 amperes. The switch shall have a two-time fault-closing duty cycle of 22,400 amperes asymmetrical at 27 kV.
- 3.4 The short-circuit fault-duty rating shall be 540 MVA or 12,500 amperes symmetrical.

4. Insulation

- 4.1 The basic impulse insulation level shall be 125 kV BIL.
- 4.2 The maximum RIV at 1000 kHz shall be 100 microvolts when energized at rated voltage.

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5. Primary Connections

All terminal pads shall have two holes sized and spaced per NEMA STANDARDS (9/16-inch holes drilled on 1-3/4-inch centers) that shall be located at least 32 inches above the lowest point of the switchgear for terminating the connectors. There shall be ample clearance around these landing pads to accommodate the following terminators:

Raychem Type HVT – 200 Series

3M 5600 Series

6. Interlocks and Barriers

- 6.1 The switchgear shall have mechanical interlocks installed between each stored energy operator and its associated switch compartment doors to prevent the operation of either source interrupter switch when its associated switch compartment door is open.
- 6.2 Each switch shall have a removable front barrier to guard against inadvertent contact with the live parts. There shall be a window panel above the barriers to allow visual check of the switch position. The barrier shall be capable of being inserted into the open gap when the switch is open.
- 6.3 All switches shall have means of padlocking in the open position.
- 6.4 Each fused switch shall have a movable front barrier to guard against inadvertent contact with live parts. These barriers shall be able to be inserted in the open gap when the fuses are in the disconnect position.
- 6.5 All phase separation panels and barriers shall be of inert material.

7. Grounding Studs

- 7.1 Each switch terminal, each fuse terminal, and each compartment ground terminal shall have a stud for attaching working grounds that use hot line clamps such as A.B. Chance #1530GP (wire size 4/0 - #6).
- 7.2 These studs shall be located in such a manner that the clamps may be readily applied or removed with a "Hot Stick."
- 7.3 The ground studs shall be capable of carrying the fault duty of the switchgear.

8. Buses

All buses shall be of copper or aluminum. Buses wrapped with organic material will not be permitted. All joints shall have suitable hardware and treatment to prevent harmful oxidation and loss of optimum contact pressure. All switches and fuse mountings shall have a grounded steel base between the contact end support insulator and the hinge end support insulator to eliminate the possible energization across the open gap.

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9. Fuses and Mountings

- 9.1 The fuse mountings shall be S&C Electric Co. SML-20, 45° opening disconnect style, vertically mounted with silencer; S&C Catalog Number 56153-C6 C8 G1G2JK8Y2 or approved equal.
- 9.2 The fuses shall be rated to interrupt 540 MVA three-phase symmetrical at rated voltage.
- 9.3 Each fuse compartment shall be furnished with three fuses for installation, and three spare fuses mounted in a suitable holder on the inside of the access door. The ampere ratings will be specified in the purchase requisition.
- 9.4 The fuse mounting disconnects shall be quick-break and fully capable of load-break operation.

10. Motor-Operated Switches

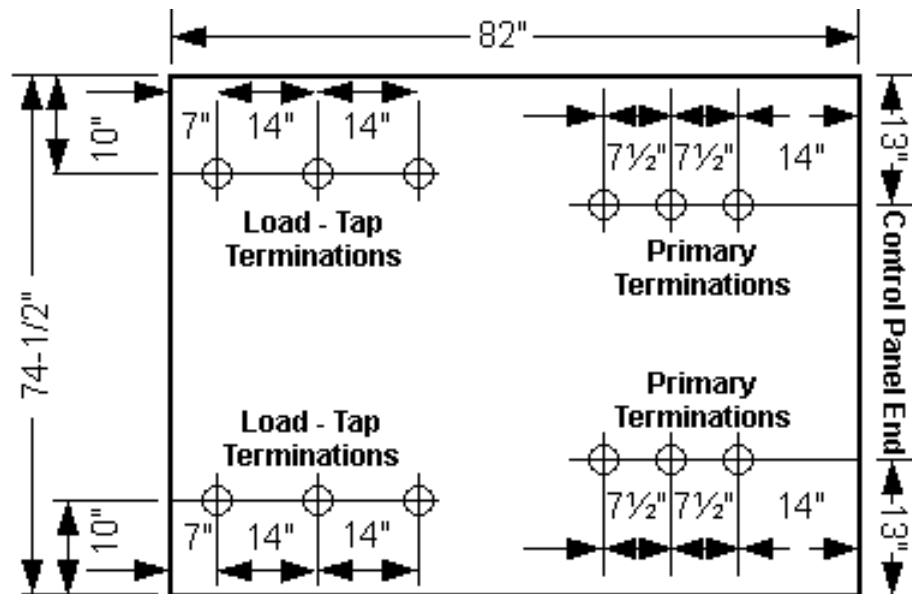
- 10.1 The switches shall be provided with quick-make and quick-break mechanisms.
- 10.2 The switches shall have motor-charged, stored energy operators for opening and closing. The stored energy operators shall have provisions for automatic trip-open and trip-closing operation with the motor charging the quick-make and quick-break mechanisms after each operation. A provision shall be made for manual charging the quick-make and quick-break mechanisms in case of loss of control power.
- 10.3 The quick-make and quick-break mechanisms shall have a manual trip and close lever.
- 10.4 The switch shall have a means of decoupling from the stored energy operator to allow operational testing of the transfer control and stored energy operator without interrupting service to the load.
- 10.5 The mechanism shall have an operation indicating target to show when the quick-make and quick-break mechanism is charged.

11. Control Instrumentation

- 11.1 The control power source shall be from three-phase, voltage-sensing units.
- 11.2 The control instruments shall provide preferred source opening and alternate source closing with automatic transfer with adjustable time delay when the preferred source voltage is lost or falls below a predetermined level. The instruments shall restore the mechanism to the preferred source after a time delay (adjustable) upon restoration of the preferred source to normal. The automatic return mode shall be programmable for open and closed transition transfer.
- 11.3 The control instrumentation shall have a selector switch for "Manual/Automatic" and "Hold-Return/Automatic-Return."
- 11.4 Test switches shall be provided to simulate the loss of preferred source voltage.

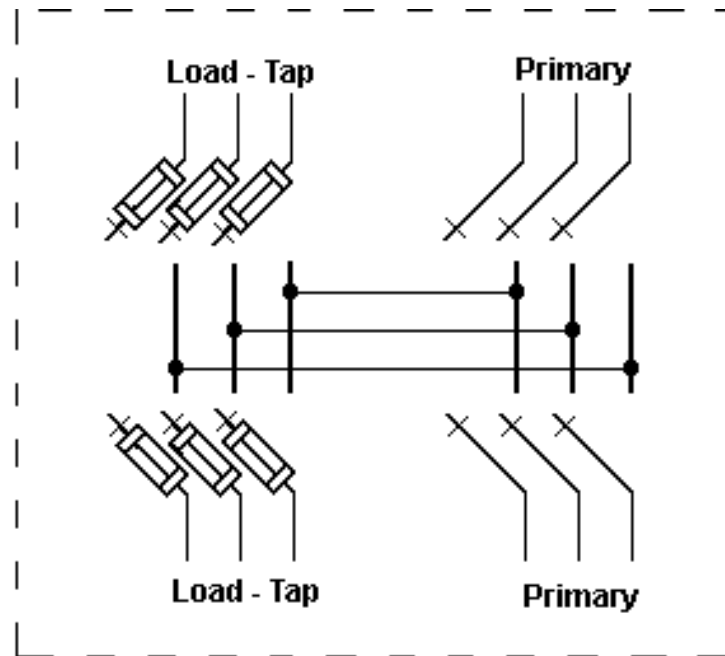
12. Enclosure

- 12.1 The switchgear cabinet shall be constructed to provide adequate space, volume and strength for fuse handling, fuse exhaust and venting, and shall withstand all pressure buildup during interruption without permanent distortion or damage to any portion of the structure.
- 12.2 Access to the unit for maintenance and cable terminations shall be through the doors to the switch or fuse compartments only.
- 12.3 The enclosure ground connection shall consist of one (or more) unpainted copper-faced steel or stainless steel pad(s), 2" x 3-1/2" with two 9/16" holes spaced on a 1-3/4-inch center. The pad(s) shall be welded to the frame on the interior of the frame near the high-voltage conductor entrances.

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Figure 12.4 Desired outline and cable entrance dimensions.



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Figure 12.5 Desired electrical schematic.

- 12.6 The cabinet shall have a primer coat of zinc-rich paint. Two coats of finish paint shall follow the primer coat. All paint applied shall be highly resistant to oil and weathering. The color of the finish coat shall be stated in the purchase order.

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13. Data to be Submitted with Bid

Each bidder shall submit with its proposal the data listed below. Each bidder shall submit a description of any changes, additions, or exceptions to this specification proposed, together with the reasons for the departure. Product evaluation and conformance to specifications will be determined on the basis of information submitted. The drawings and data furnished must be sufficient in detail and clarity to enable making a complete and positive check with the technical provisions of this specification.

- (a) Outline drawings with overall dimensions.
- (b) Information concerning details of construction.
- (c) Complete fuse data.
- (d) Detailed information on short-circuit capability.
- (e) State all electrical tests given and whether these tests apply to all units or only to sample units.
- (f) Total weight of complete switchgear assembly.

14. Data to be Furnished by the Successful Bidder

The successful bidder shall supply:

- (a) One certified copy of all standard tests.
- (b) Three copies of an instruction book covering installation, operation, and maintenance of the equipment.
- (c) Time-current curves of all fuses and protective relays.

15. Guarantee

If any part of this equipment fails due to defective design, material, and/or workmanship within 24 months after delivery, it shall be replaced without cost to the Lighting Department.

16. Patents and Infringements

The manufacturer shall defend the Seattle Lighting Department against any litigation arising from all patent infringements of the equipment furnished. If such equipment is as infringing, the manufacturer shall either secure for the Lighting Department the right for its continued use, or replace it with non-infringing devices that comply with this specification at no cost to the Seattle Lighting Department.